Space Weather Forecast

Issued on Friday, 01 September 2023 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of G1/Minor Storm intervals day 1 (01 Sep) from arrival of fast winds, and later day 2 or early day 3 (02-03 Sep) due to CME arrival. Chance of Isolated M-flares (R1 Blackout).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only low common class flares observed. There are currently five sunspot regions on the visible disc. The largest region is in the northwest disc, and this is the most likely source of flare activity with ongoing development of peripheral spots, and a moderate complexity. The next likely region is in the southeast, as while smaller it does have a slightly more unusual structure with two main negative leaders and only small trailer spots. In the southwest, a further spot persists as a simple and slowly weakening bipolar spot. The other two regions are simple mature unipolar spot.

A filament (ribbon of material held together by the Suns magnetic field) was observed lifting off the northwest of centre-disc at around 30/2100 UTC. This was a slightly unusual event as despite being located in the northwest, the subsequent coronal mass ejection (CME) was to the south and slightly to the east, perhaps due to the proximity of a coronal hole to the northwest of the eruption. While analysis is ongoing this preliminarily been assessed as Earth-directed, likely arriving late day 2 or early day 3 (02-03 Sep).

Solar Wind / Geomagnetic Activity: Solar winds were at background levels at first, before the earlier arrival of a fast wind from a coronal hole, which is situated in the northwest of the disc. Speeds were between 280-350km/s, before increasing to slightly elevated levels, currently near 430km/s. The magnetic field was initially weak, increasing to moderate with the arrival the fast wind, while its north-south component was also weak to moderate. Geomagnetic activity was mostly Quiet (Kp 0-2), with a provisionally Unsettled (Kp 3) interval between 31/0900-1200 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: : Activity is expected to be Low with a chance of rising to Moderate due to any M-flares, most likely from the larger sunspot region in the northwest.

Solar Wind / Geomagnetic Activity: Coronal Mass Ejection (CME) from the filament eruption 30/2100 UTC, is currently anticipated to arrive late day 2 or early day 3 (02-03 Sep), before effects wane on day 4 (04 Sep). Solar winds are currently slightly elevated, which looks likely to be associated with the early arrival of the fast wind from CH40/+ located in the northwest. The fast wind is then likely to ease for a time, before the CME arrival. Quiet geomagnetic activity at first is forecast to become Unsettled to Active with a slight chance of G1/Minor Storms due to the arrival of HSS from CH40/+ during day 1 (01 Sep). Any CME arrival later day 2 or early day 3

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(02-03 Sep) will then bring a chance of G1/Minor Storms, with a slight chance G2 Moderate Storms, before easing later day 4 (04 Sep).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background levels with no solar radiation storms expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	30	30	20
Strong	G3	No	1	5	5	2
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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